Some Observations on the Bahamas and Jamaica.

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The American Philosophical Society having last season set apart from the Michaux legacy the sum of three hundred dollars towards defraying the expenses of my West Indian exploring and collecting trip, I desire to offer the following:

The object of the appropriation was the collecting of photographs and information which could be utilized in the preparation and delivery of the annual lectures, popularly known as "The Michaux Forestry Course."

Towards accomplishing this, the islands of New Providence, Eleuthera, San Salvador, Watling and Inagua, all of the Bahama group, were visited, as well also as Jamaica and its lesser political dependency, the Grand Cayman, which is situated one hundred and ninety nautical miles, nearly W.N.W., from the western end of Jamaica.

As the time allowed for my entire trip was but three months, it is evident that no prolonged stay could be made in any one place. We devoted by far the greater portion of our time to the island of Jamaica, and found everywhere, but especially on its greatest altitudes of 7000 feet, ample returns for our search.

In all, about one hundred and fifty good negatives were obtained. As duplicates were usually made, it is fair to say there are about seventy-five satisfactory illustrations of trees, physical geography and topography of the islands visited.

How rich a field the island of Jamaica offers may readily be inferred from the following facts:

1. If reduced to a square, the island would be about sixty-five miles long by as many wide.
2. Its population is only about 600,000 souls.
3. Only twenty-five per cent. of its area is under cultivation.
4. The agricultural methods are very primitive and fertilizers are sparingly used.
5. Notwithstanding these facts, this small area, after retaining enough for home uses, sends into the markets of the world nearly $9,000,000 worth of products each year. These are mainly from the vegetable kingdom.

It is well, also, to call attention to the fact that, of these exports, probably about fifty per cent. are shipped to the United States as against thirty-seven per cent. to Great Britain. Of fruit alone, we received in 1889 not less than $1,580,000 worth, as rated by the exports there. Of course, its value here was vastly greater. There has been during the past five years a *decided increase* in the trade with the United States, and *some also* with Canada.

In spite of the relative proximity of the Bahamas and Jamaica, the contrast between these islands is exceedingly marked. The Bahamas are low and show no considerable elevations. Jamaica reaches a maximum altitude of 7360 feet above the sea level. The soil of the Bahamas is scanty, and consequently cultivation entails fertilization. That of Jamaica is of great depth, and its continued productiveness is evidence of a vast natural fertility. The flora of the Bahamas shows marked resemblance to that of Florida. The flora of Jamaica is essentially tropical, save at such altitudes as suit plants of cooler regions. In such places we found the common chickweed (*Stellaria media*), the white clover (*Trifolium repens*), associated with plants from the cooler parts of southern regions.

The mangrove (*Rhizophora mangle*), common to the tropical seas around the globe, attains in Jamaica (compared with that in Florida and in the Bahamas) a surprising height. Near Port Morant are large jungles, where the trees attain a height of at least sixty feet. This is the proper place to call attention to possible tannin production, which the mangrove suggests. No tree that we have here, at all approaches it in the

now so important to Jamaica, has been introduced there.

Of the original forest but little remains in Jamaica, though reproduction has again covered the steeper slopes with a luxuriant growth of timber.

Jamaica is not wanting in hard woods. Some of these are of great value. It is claimed that of these they need none from us. Though, on the other hand, it is equally sure that for white and yellow pine the island draws very largely upon our resources. The United States furnished Jamaica in 1889 nearly $200,000 worth of building material, of which the major part was probably lumber. It is not probable that the economic resources of the vegetable kingdom in Jamaica are properly recognized, or that we derive from them now anything like what we shall in the future.

Attention should also here be called to the fact that, years ago, attempts were made to introduce the Sisal hemp from Yucatan into the islands on the southern coast of Florida. It appears to have been abandoned (probably from want of proper machinery to extricate the fibre). The plants are now growing wild in these Florida islands, and have been

introduced, under the intelligent and earnest direction of Gov. Sir Ambrose Shea, into the Bahamas, where they promise soon to furnish large quantities of fibre which will rival manila in the markets of the world.

From Publication No. 86, of the U. S. Hydrographic Office for the Year 1888, page 1, I quote the following: "The sea breeze generally sets in about 9 A.M., and, blowing either directly on shore, or, according to the trend of the coast line, at an angle to it, continues till about sunset, when a calm interval is succeeded by a light off-shore air, attaining its greatest strength about day dawn, and being succeeded by an oppressive calm, to be again followed by the sea breeze. On the coasts of Cuba, Santo Domingo, Puerto Rico and Jamaica, the regular sequence of land and sea breezes is seldom interrupted." So far as our observation could go in so brief a period, we can entirely confirm this general statement. These local breezes must not, however, be confounded with the trade winds which, from latitude 28° N., come normally from the N.E. or E.N.E. and sweep over the ocean areas in which these islands lie. Neither must we lose sight of the fact that, at Kingston, in Jamaica, the wind comes the year through almost constantly from the S.E.

Observation has shown that during the months of November, December and January frequent rains fall upon the northern side of the island of Jamaica. It would appear as if the direction of these trade winds and the position of the island of Cuba might explain some notable differences in the distribution of this winter rain upon the northern shore of Jamaica. From Cape Maysi, on the eastern end of Cuba, to Morant Point, the eastern end of Jamaica, the direction is N.E. ½ N. or about N. 39° E. The distance is about 180 nautical miles. Port Antonio bears by the compass from Cape Maysi about 8° more to the westward than Morant Point. Both of these places are, however, fairly in the line of the N.E. trade winds, which may reach them without sweeping over the mountainous, fog-enveloped eastern end of Cuba. It is important to bear in mind that these mountains on the eastern end of Cuba attain a height of 7000 feet and must have a temperature considerably below that of the sea level. A line drawn from Lucea, on the northwestern end of Jamaica, would cut the mountains of Cuba about 100 miles from the eastern end. In other words, the trade winds from the N.E., to strike Lucea, must first cross the mountains of Cuba, where, by the lower temperature, the moisture is precipitated. Whereas, the normal N.E. trade wind can reach Port Antonio without having to cross the Cuban mountains. The latter reach the Jamaica coast as wet winds, whose moistu re is precipitated on the northern side of Eastern Jamaica; but the winds which reach Lucea come as dry winds.

The facts, as observed by us, were, first, the large aqueous precipitation of Port Antonio and the small precipitation at Lucea. The whole fact is briefly expressed by the saying of the sailors, that to find Port Antonio you had but to enter the blackest, rainiest port on the northern side of Jamaica.

The practical bearing of this is not hard to see from a sanitary standpoint. The high ground on the western end of Jamaica is the climate most suitable for the invalid. The beautiful little town of Lucea, if it possessed a large, well-kept hotel, would be an ideal winter resort for our northern invalids.

Whether considered from the standpoint of climate, scenery or productiveness, Lucea could be made a more desirable winter resort than the Bahamas. Indeed, I am so strongly impressed by the possibilities of Northwestern Jamaica for the invalids of the future that I cannot refrain from making these statements as positive as I have.

There is one more factor to be considered in the climate of Lucea. It is that the trade winds from the N.E. tend, on striking the northern coast of Jamaica, to be deflected into E.N.E. winds. This would place Lucea somewhat under the protection of the parishes to the east of it; so far, at least, as the rainfall is concerned.

We lay in the harbor of Port Morant, on the southern side of Jamaica, whilst a furious north wind was blowing on the northern side of Jamaica and deluging the region near Port Antonio with the rainfall. Yet we received a very moderate share of the rain, which was drained from the clouds by the mountains north of us.

Dr. Morris read a note from Mr. Patterson, Trustee under the will of the late Franklin Peale, suggesting the removal of the stone-age collection of relics, and moved that the Curators be instructed and authorized to withdraw from the custody of the Academy of Natural Sciences the Peale stone-age collections.

A discussion ensued, in which Dr. Brinton, Dr. Morris, Dr. Cope, Mr. Dudley, Mr. Martindale and Mr. Du Bois took part.

The President stated the manner in which the Society had become the owner of the collection referred to.

On motion of Mr. Dudley, the further consideration of the whole matter was postponed until the next regular meeting of the Society, and the Curators were requested in the meantime to examine into the facts and report upon the same.

At the call of deferred business, the report from the Committee of which Prof. E. D. Cope was Chairman, postponed from May 1, 1891, was taken up and considered.

Prof. Cope requested that the same might be postponed until next meeting, which, on motion, was agreed to.

And the Society was adjourned by the President.